

ECONOMIC AND ECOLOGICAL
IMPACT OF
SECOND HOME DEVELOPMENTS
ON LOCAL AREAS

BY
James N. Morgan
Bureau of Business and
Industrial Development
Northern Arizona University

Study Financed by
a Grant from the
Eisenhower Consortium

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James N. Morgan

December, 1978

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CHAPTER I

INTRODUCTION

This report presents a summary of research findings relating to the economic and ecological impact of second homes. The study area was an area of Southern Coconino County, Arizona including Flagstaff, Williams and the Coconino County portion of Sedona.

Second Homes

Second homes vary widely in their physical characteristics, location, and nature of use, if a broad definition (that a second home is any homesite located in any area away from the primary residence and used as a residence by the owner) is accepted. Second homes surveyed in this study range from homes completely equipped for full time occupancy with all traditional utilities and priced at over \$50,000 to homes valued at less than \$10,000 and having no electricity. Use of second homes surveyed varied from some homes that were used by some family members 180 days of the year and were used as full time summer residences to others that were used only for a few weekends during the summer months. Locations of second homes varied from one of the most popular housing developments of Flagstaff, Arizona (Continental Country Club in southeast Coconino County) to remote locations many miles from the nearest town.

A common characteristic of all second homes as defined by Bond and Dunikoski [1976] is that they are associated with recreational or leisure-time activities. That is, the second homes are not located near the owners' workplace; they are used either by retired persons or by working people and their families during leisure periods (holidays, weekends, vacations). Since second home owners come to their second home sites to participate in recreational and leisure activities they may be expected to make particularly heavy use of National Forest areas. The fact that the primary residence of most people owning second homes in Northern Arizona is in a metropolitan area which is remote from forest land, also contributes to heavy forest use by second home owners. Also many second homes are located very near and in a few cases on National Forest land, and thus the use of these second homes is likely to have an impact on the environmental quality of National Forest lands. Because of the above mentioned factors and considering the rapid growth in second homes ownership both nationwide and in Northern Arizona, it is important to examine the impact of second homes on both the economy and the ecology of the affected area.

Impact of Second Homes

Second homes cause a variety of impacts on the area in which they are located. On the one hand they allow more people to use and enjoy forest lands and they contribute to the economic growth of the surrounding area. On the other hand they may cause a deterioration of the forest environment. This may occur either

through over-use of forest lands or through worsened visual appearance and water quality caused by inadequate solid and liquid waste disposal by owners of second homes near National Forest lands. In addition, second home development has an effect on the use of scarce resources in the area. Such scarce resources include both energy resources and, at least in the case of Northern Arizona, water resources. The impact of second homes on water availability in Northern Arizona has been the subject of a previous study, Bond and Dunikoski [1977].

Purpose of the Study

This study is designed to provide both quantitative and qualitative information about the economic and ecological impacts of second home development on a specific area of Northern Arizona (Southern Coconino County). The area is one containing a large amount of National Forest land (parts of Coconino, Kaibab, Sitgreaves, and Prescott National Forests). Results developed for this region may to some extent be generalized to other National Forest areas containing second home developments. It is intended that this study will provide information about economic and environmental benefits and costs of second homes which will be useful in guiding forest service policy toward second home development.

More specifically, research objectives of this study were to:

- (1) Estimate the population of second homes in the study area; and through comparison with other studies, analyze the growth trend of second homes in the area.

- (2) Obtain estimates of the economic impact of second homes on the study area. This will include analysis of the spending patterns of second home owners as compared to year round residents and tourists and measurement of the total dollar impact of second home owners on the area economy through use of the Mogollon Rim input-output model.
- (3) Obtain descriptive statistics evaluating the type and quality of waste water disposal systems utilized in the area's second homes.
- (4) Compile estimates of use of various types of energy resources by second home owners. Convert the various types of energy use to measurement in a common energy unit so that second home energy use may be compared to that of permanent residents.

Outline of the Study

The study has incorporated the results of past studies, secondary data, and some direct survey results in deriving the information presented here. The methodology was in all cases designed to minimize the amount of information to be obtained by direct survey.

Chapter II consists of a review of literature related to second homes with particular emphasis on studies relating to Arizona and studies addressing ecological concerns.

The analytical portion of the study may be divided into four main parts: a census of second homes in the area, analysis of waste disposal problems of second homes, and measurements of the impact of second homes on the use of scarce resources in the area. These results are presented in Chapters III through VI.

The census of second homes was accomplished by examination of Coconino County property tax records to identify parcels having a set of characteristics which identified them as second homes. The criteria used to identify second homes is described in Chapter III. The results of this census were compared with past studies to provide an indication of trends in second home ownership in the area.

The census of second homes was also used to provide a sample of second home owners who were sent questionnaires. The questionnaires were sent to a random sample of one-third of the second home owners identified by the second home census. The questionnaires were used to obtain direct spending, utility use, and waste disposal information from second home owners. The survey is discussed in Chapter IV and survey results are used in compiling the analysis presented in Chapters IV, V, and VI. The spending patterns of second home owners are also presented in Chapter IV. These patterns are compared with the spending by permanent residents and tourists. In addition, this direct survey information is applied to the Mogollon Rim input-output model, Baskett and Ayers [1976], to provide estimates of the total (direct and indirect) impact of second homes on the economy in the very short run, the short run, and the long run.

Survey information with respect to waste water and solid waste disposal facilities at second homes is presented in Chapter V. Information about both the type and adequacy of second homes is provided.

Chapter VI presents estimates of spending for various types of energy sources (electricity, fuel oil, natural gas, and propane) by second home owners. These spending estimates are derived from survey data. These spending figures are converted to estimates of BTUs of energy used so that energy use per second home may be compared to average energy use by full time resident households, and the total impact of second homes on area energy use may be assessed.

CHAPTER II

REVIEW OF RELATED STUDIES

A variety of studies relating to second homes have been conducted. The results of a few of these studies which relate to the region and the topic of this study are reviewed below. This chapter is in no way intended to be an exhaustive review of second home literature.

Two studies providing information about the long run growth trend of second homes in rural Arizona are Rural Residential Development on Private Land in the Mogollon Rim Area, U.S. Department of Agriculture, Forest Service [1972] and Inside Phoenix, Consumer Analysis of Phoenix Newspapers, various years. The former study indicated that there had been a strong trend toward subdividing rural land suitable for residential use, and that many of these subdivisions were intended primarily for second home use. The latter report, published annually, has included an estimate of the number of Phoenix area residents owning second homes. These estimates have indicated a very strong (over 15% per year through the 1960's and early 1970's) annual growth rate in the number of Phoenix residents owning second homes.

Timothy Hogan [1977] conducted a survey of characteristics and attitudes of second home owners in Northern Arizona. He found that second home owners tended to be persons with a relatively high income and an above average educational level.

They also tended to have larger than average families. Survey responses indicated that most second home owners purchased these homes for use as summer residences; however, the study also revealed that many individuals bought their second homes primarily for retirement or as an investment.

Three of the survey questions dealt with environmental concerns. Owners were asked if fire protection at their second home was adequate. Fifty-four percent of those responding felt that fire protection was inadequate or nonexistent. Second home owners were also asked about the adequacy of the solid waste and sewer system facilities at their second home sites. Thirty-seven percent of the respondents felt that current solid waste disposal facilities were inadequate, while twenty three percent of the respondents expressed a desire for improved sewer facilities at their second home sites.

Shahen and Hoff [1976] surveyed rural subdivision residents with regard to forest use. This survey was not restricted to second home owners but was sent to residents of subdivisions which were felt to contain a large number of second homes. The survey indicated that the most significant family characteristic in determining use of forest land was family size. Families with two small children were the most frequent forest users. Further, residents of rural subdivisions (possible second home owners) were found to have used the forest less than residents of Northern Arizona cities during all seasons of the year except summer. There was no significant difference in use by the two groups during the summer.

A study of the impact of second homes on water use in

Northern Arizona was undertaken by Bond and Dunikoski [1977]. They conducted a census of second homes in a study area covering North Central Arizona. They found a total of about 10,000 second homes in the study area (Coconino, Gila, Navajo, and Yavapai counties), and concluded that the number of second homes had increased by about ten percent per year over the preceding ten years.

Their study also included a survey of water use by second home owners obtained by investigation of water company records. They found that the average water use per second home owner in the area was 24,763 gallons per year. Water use by second home owners was found to be an insignificant part of total water use in that the second home water use amounted to only two-tenths of one percent of total municipal and industrial demand, and less than two-one hundredths of one percent of total water use in the state. Because of the small proportion of total water use that second homes contributed, Bond and Dunikoski concluded that the quantity of waste water produced by second homes was perhaps not as important as the question of the adequacy of waste water disposal facilities.

Burton Segall [1977,73] specifically investigated the effects of rural sewage disposal systems on the quality of groundwater in Northern Arizona. He concluded that, for most campground and second homes, secondary treatment facilities (sewers) requiring waste water collection and conveyance present a greater threat to the forest environment than do septic tanks and privies. A septic tank failure would cause only a localized problem whereas failure of a sewage treatment plant would cause a much more

wide spread detrimental impact on the environment.

No study relating specifically to the economic costs and benefits of second home development in Northern Arizona is available. However, some such studies have been conducted for other regions. Gordon Lewis [1975] analyzed the costs and benefits to local governments in developing second-home communities. He found that, at least initially, the benefits typically outweighed the costs because second homes substantially increase county tax revenues without causing great increases in high cost public services. Lewis found that these conditions may change as vacation home developments mature. Since often these vacation homes become permanent residences whose occupants make much more intensive use of local government services.

The studies reviewed above provide some guidance with regard to fruitful avenues of inquiry in the present study. This is particularly true with respect to the environmental concerns of the study. The results of past studies indicate that the adequacy of second home waste disposal systems may be a more important consideration than the quantity of solid waste and waste water produced by second homes.

CHAPTER III

SECOND HOMES IN

SOUTHERN COCONINO COUNTY

This study analyzes the impact of second homes on the economy and ecology of Southern Coconino County, Arizona. The boundaries of the study area are indicated in Figure 3.1. There are several reasons for the selection of this sample area. First, it is an area containing a large amount of National Forest land which has been shown to contain a large number of second homes, Bond and Dunikoski [1977]. Second, an input-output model is available for this region. Finally, the sample area is such that secondary information for the area could be readily obtained by the researchers. The study area includes all properties listed in selected books of Coconino County property tax records (these areas are indicated in Figure 3.2 page 13).

The study area includes most of Coconino National Forest. In addition sizable portions of Kaibab and Sitgreaves National Forest and a small strip of Prescott National Forest are also in the study area.

1977 Second Home Inventory

The problem of getting an accurate measure of the number of second homes in an area is made difficult by the fact that no direct "count" of the number of second homes in an area is available. The census of second homes therefore had to be accomplished through indirect means. The method utilized was

FIGURE 3.1
SECOND HOME STUDY AREA

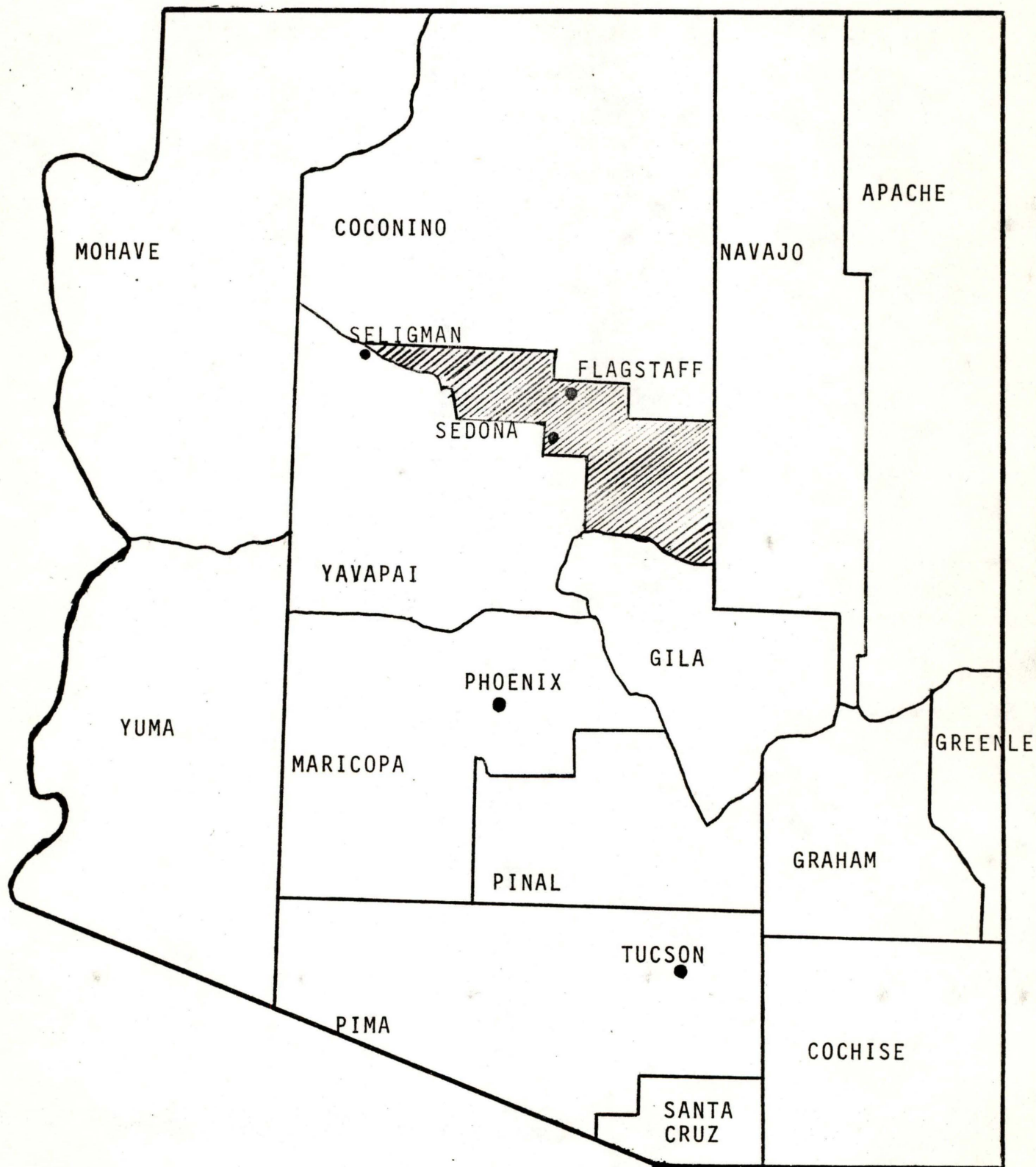
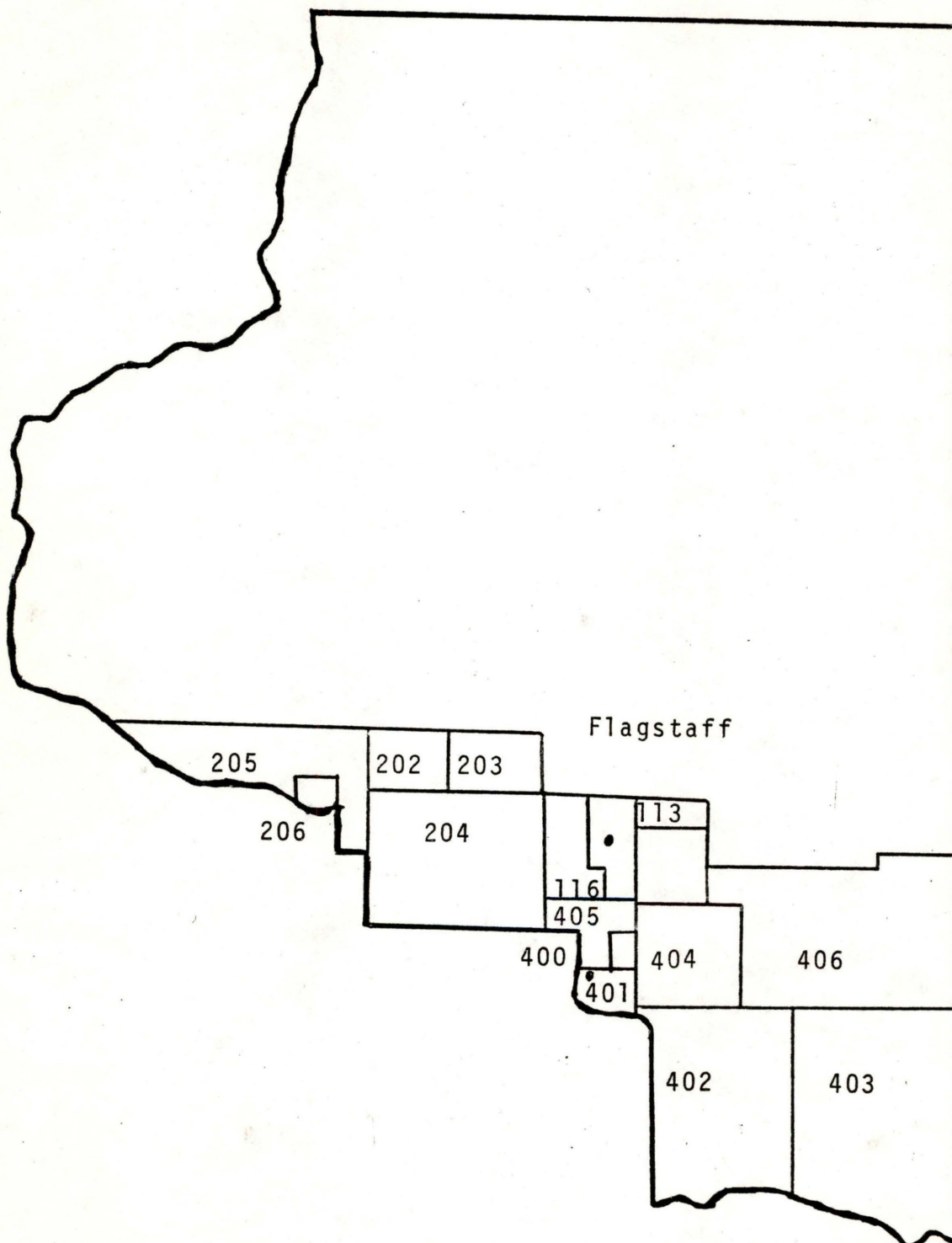


FIGURE 3-2
COCONINO COUNTY



identical to that used by Bond and Dunikoski [1977]. This methodology appears to be the most accurate technique available at reasonable cost. An added benefit of use of this procedure is that the Bond and Dunikoski study provides an earlier count of the number of second homes in the area under a common methodology.

The census of second homes used in this study was obtained by inspection of Coconino County property tax records. The records were analyzed to isolate those parcels of land possessing characteristics which identified them as second homes. The characteristics sought were that the home site should be used predominantly for residential purposes and it should not be the primary residence of the owner. To identify those homes which met these conditions only homes which met the following three criteria were counted as second homes:

- (1) They must be assessed at 15 percent of total valuation. This identifies the property as being residential rather than commercial in nature. Property used for rental purposes is assessed at 27 percent.
- (2) The property must have improvements with an assessed value of at least \$1000. This insures that the property is likely already in use as a residence and is not a property being held for future use as a retirement home site.
- (3) The property owner must list a mailing address outside the study area. This indicates that the property is a second home and not a primary residence.

There were 1352 second homes in the study area as of mid-1978 according to our census. The number of second homes located in the areas covered by various Coconino County property tax

TABLE 3.1
1978 Census of Second Homes
In Southern Coconino County

<u>BOOK NUMBER</u>	<u>SECOND HOMES</u>
113	108
116	117
202	12
203	60
204	17
205	0
206	6
400	523
401	119
402	38
403	216
404	47
405	89
406	0
TOTAL	1,352

SOURCE: Derived from study data,

books are listed in Table 3.1. These figures indicate that second homes tend to be concentrated in certain locations within the study area. In fact, in conducting the census, our researchers noticed that in several areas there were subdivisions in which over 75 percent of the homes were second homes.

A surprising result of the census was that our 1978 count of second homes indicated that there were 16 percent fewer second homes in the study area than had been found in the 1976 census conducted by Bond and Dunikoski. A book by book comparison of the number of second homes found by the two studies indicates that most of the decline was concentrated in a few areas (book 403 and 404). This decline might suggest that many of the second homes built in these areas were intended for eventual year round retirement residences and the owners have since retired to these properties.

The count of second homes obtained by the methodology used here is likely to be a somewhat conservative estimate for two reasons. First, some owners who make extensive use of their second homes may have their property tax assessments sent to their second homes. Second, there may be some properties used as second homes which do not have improvements assessed at over \$1000. This would be the case if a mobile home were used as a second home since mobile homes are not assessed as an improvement for property tax purposes. A census of second homes in a portion of the study area using a broader definition has been conducted by the Northern Arizona Council of Governments.¹ This study classified as second homes all properties for which the listed

¹. This information has not yet been published and was supplied by David Esposito of Northern Arizona Council of Governments.

mailing address was outside the area and which were assessed at rates which indicated that they were used as residences. (The condition that improvements assessed at \$1000 or more be present was not imposed.) The area covered by this census included only two property tax books in common with our census. Comparative data over those two books indicated approximately 35 percent more second homes under this broader definition. It is quite possible that this broader definition overstates the number of second homes since some properties with less than \$1000 in assessed value are likely to be undeveloped or partially developed sites for future retirement homes. For purposes of this study the results of our census will be used as a measure of the number of second homes in the area, although it must be noted that this is probably a somewhat conservative estimate.

Relative Importance of the Second Home Population

An important part of the ecological impact of second homes on National Forest lands is their contribution to crowding in these areas. Possible detrimental effects on the environment due to the use of forest lands by second home owners include added danger of forest fires and harm to the visual attractiveness of forest areas.

Some idea of the contribution of second home owners to forest use and to the general congestion of the study area may be attained by looking at the number of second homes in the area relative to the number of primary (year round) residences. The number of primary residences in the study area was estimated

to be approximately 15,500.². Thus according to our census of second homes they amounted to 8.5 to 9 percent of the number of primary residences in the study area. Using the broader definition of second homes utilized by the Northern Arizona Council of Governments the second home population might amount to 11.5 to 12 percent of the number of primary residences in the area.

The ratio of second home residents to year round residents varies greatly from season to season. On average throughout the year, the number of people living in the area per second home is much lower than the number of residents per - primary home since the former group does not live in the area for the entire year. However, during peak periods of second home use (summer weekends) the number of people in the study area per second home may approximate the rate for primary residences. A past survey of Arizona second home owners, Hogan [1977], indicates several reasons to expect a very high rate of use of second homes during summer weekends. A large portion of second homes was found to be

². This estimate relies on two simplifying assumptions. First, it assumes that the ratio of the number of structures to total resident population has not changed since 1970. Second, it assumes that the ratio of population in the study area to the total population of Coconino County is identical to the ratio of population in cities over 1,000 in population in these areas. The number of residents per structure in Coconino County in 1970 was 3.26, U.S. Census of Population-1970. The population of Coconino County as of July 1, 1978 was 67,500. Arizona Department of Economic Security [1978]. Thus the number of structures in Coconino County as of 1977 was estimated to be:

$$67,500 \div 3.26 = 20,683.$$

Seventy five percent of the total population of Coconino County residing in places of over 1,000 population in 1977 were residents of the study area. Thus the number of structures used as primary residences in the study area was assumed to be:

$$20,683 \times .75 \approx 15,500.$$

used as full time summer residences; over 80 percent of second home owners had their primary residence in the Phoenix metropolitan area and would be likely to use their second homes on hot summer weekends; and second home owners tended to have larger than average households (4.2 persons per household).

Second home owners may thus be expected to add a maximum of 8 to 10 percent to the resident population base of the area during peak use periods. Our survey indicates (see Chapter IV) that the average level of second home occupancy year round is only .8 persons per second home. After adjusting for the sharp difference in occupancy per structure between primary and second homes (3.26 persons per structure compared to .8 persons per structure), second home owners contribute only about 2 to 2.5 percent to the average year round population level of the area.

No direct analysis of second home owners' use of forest land relative to use by permanent residents is available. However, Shahan and Hoff [1976] compared forest use by city residents with that by residents of rural subdivisions that were felt to have a high proportion of second homes. Their study indicated a lower number of person days of use of forest lands by these rural subdivision residents during all seasons of the year except summer. Forest land use by rural subdivision residents in the summer was not significantly different than use by city residents. Thus, the ratio of the number of second homes to primary residences in the area may be viewed as an upper limit on the proportion of forest use that is due to second home owners.

To summarize, available information indicates that second home owners may contribute up to 8 to 10 percent of total forest use and area population during peak periods of use (summer

weekends). Their year round contribution to forest use is probably a much lower percentage, however, since second home owners contribute only 2 to 2.5 percent to the average year round population level of the study area.

Second Home Growth Trends

Various sources give rise to quite different estimates of the rate of growth in the number of second homes in the area. Comparison of our count of second homes in the Southern Coconino County area with the number of second homes found in this area in the Bond and Dunikoski [1977] study of two years ago indicates a 16 percent decline in the number of second homes over that period. However, data cited in Bond and Dunikoski's study indicate that over the decade from the mid-sixties to the mid-seventies, the number of second homes in a broad area of Northern Arizona grew quite rapidly. Their data showed the number of second homes grew by an average of 10 percent a year over that period. In addition, their study cited an annual survey by Phoenix Newspapers Incorporated which indicated that the number of second homes owned by Phoenix SMSA residents had increased by an average of 17.1 percent per year over the period from 1967 through 1976.

National and regional statistics indicate a much slower rate of growth in second homes than that found by the Bond and Dunikoski study. Data from Current Housing Reports of the U.S. Bureau of Census show that the number of second homes owned by residents of the west region increased by an average of 2.1 percent from 1970-1975. Similar figures for the nation as a whole

indicate a growth rate of almost exactly one percent per year.³

The available evidence does not enable one to speak confidently about the trend in second home ownerships in the study area. It is not clear that the recent decline in second homes in the area found by our census represents a permanent trend. In fact, given the rapid population growth of the metropolitan areas of Arizona, a rate of growth in second homes above the average rate for the west region, and perhaps closer to the rate found in the Bond and Dunikoski study may be expected. The number of second homes in the study area and in all of Northern Arizona appears likely to increase at a rate slightly more rapid than the population growth of the area. Thus, the relative importance of second homes on the economy and ecology of the area may be expected to increase over time.

³The number of second homes in the west region increased 10.7 percent from 1970 to 1975, while the number of second homes in the U.S. as a whole increased 4.8 percent over the same period, as indicated by Current Housing Reports, U.S. Bureau of Census, various editions.

Chapter IV
ECONOMIC IMPACT
OF SECOND HOMES

The economic impact of second homes on the study area has been measured by conducting a direct survey of spending by second home owners for various items. These data give an estimate of the direct spending by second home owners but they do not measure the total impact of second homes on the area economy. Spending by second home owners causes increases in employment in industries required to service the needs of second home owners and these new employees will spend money in the area as well. To measure these "indirect" effects of second home owner spending, the data on direct spending by second home owners are applied to an input-output model of the study area, Baskett and Ayers [1976] and Ekholm [1977].

Second Home Survey

A survey of second home owners in the study area was conducted to obtain information about their spending patterns, their level of use of the second home, their waste facilities and their use of energy resources. A copy of this survey form is included as Appendix A of this study. The survey was sent to 475 area second home owners representing a random sample of one-third of the second home population of the study area. Complete responses usable for all aspects of the study were obtained from 132 individuals for a response rate of 28 percent. A total of 174 responses

were received which were complete enough for use in the waste disposal portion of the survey. This represents a response rate of 37 percent.

As a check how well those repoding to the survey represented the second home population, the average assessed value of the second home properties of owners who responded to the survey was compared to the average assessed value of the second home properties of all owners to whom the survey was sent. The mean assessed value did not vary greatly between the two groups, and that observed variation was not statistically significant at the .05 level.¹ Thus there is not any obvious bias in the survey responses.

Consumption Spending of Second Home Owners

The pattern of consumption spending by area second home owners has been estimated from a set of questions in the survey relating to spending. Second home owners were asked to report their spending in the second home area over the preceding year for several categories of purchases. The categories were: food at home, food away from home (restaurant and bar sales), recreation, gasoline and automoblie repairs, clothing, furniture and appliances, utilities, and all other spending. The average level of spending per second home for each category (as computed from survey data) is presented in Table 4.1. The categories

¹ Respondents: Mean = \$2933 standard deviation = 1507, $n_s = 132$, Population: mean = \$3094, standard deviation = 1717, $n_p = 475$, $Z = \frac{3094 - 2933}{1507 / \sqrt{132}} = 1.18$, which is not significant at the .05 level.

Table 4.1
SPENDING PATTERNS OF SECOND HOME OWNERS

Category	Spending per User Day (285.6 User Days per Home)	Spending Per Second Home	Total Spending All Area Second Homes (1352 Homes)
Food at Home	\$1.21	\$346	\$467,800
Restaurants & Bars	.53	152	205,900
Recreation	.51	146	197,700
Gas & Auto Repairs	.62	176	238,100
Clothing	.15	43	58,000
Furniture & Appliances	.44	127	171,200
Utilities	.88	252	340,200
Other	1.03	293	396,000
Total	\$5.37	\$1535	\$2,074,900

Source: Study Survey Data

with the largest average amounts of spending were food and beverages consumed at the second home and utilities.

An estimate of the number of person days of second home use was made in order to get a picture of the intensity of spending by second home owners during periods when the second homes were in use. Second home owners were asked to list the number of people who made extensive use of their second home (20 days or more) in the past year. They were also asked to list the number of days the second homes were used during the past year. Total use days were estimated by multiplying the number of users by the number of user days over which the second home was used. The average number of user days was 285.6 which is almost exactly equivalent to .8 full time residents. This measure of user days is likely to be at least a slight overestimate since not all of the frequent users of the second home would have used it on each of the days that it was used. The estimated total spending per user day of \$5.37 may therefore be regarded as a lower limit on the average level of spending per user day.

The figures for total spending by all second home owners in the study area were computed under the assumptions that there were 1352 second homes in the study area as indicated by our census, and the spending estimates generated by our survey were representative of the spending patterns of all second home owners of the area. The spending figures per second home were simply multiplied by 1352 to obtain estimates of total second home spending which are also presented in Table 4.1. Total consumption spending within the study area by second home owners was estimated

to be \$2,074,900. Of this total almost half a million dollars was for food and beverages purchased for consumption at home.

Variations in Second Home Use

Since the majority of area second home owners (over 80 percent of those responding to the survey) were subdivision residents, the spending patterns and number of user days per second home were computed for each subdivision containing 5 or more respondents. Comparison of these figures indicated a wide variation both in use and in spending in the area across the residents of different subdivisions. The average number of user days per second home varied across subdivisions from a high of 357 user days to a low of 127 user days. Use was apparently highest in second homes in more expensive subdivisions and those near area cities and towns. It is likely that a high percentage of second homes in those subdivisions are used as full time summer residences. Expenditures per user day also varied widely from subdivision to subdivision. The highest rate of spending per user day was \$10.25 while the lowest was \$3.77. The intensity of spending was lowest in subdivisions in the southeast corner of the study area which are remote from study area trade centers. Some second home owners in those study areas reported that they bought most supplies for their second home in the area of their primary residence due to the remoteness of their second homes. A map showing the location of these subdivisions and tables indicating the average level of use and intensity of spending in the various subdivisions are shown in Appendix B.

Use of second homes varied considerably through different seasons of the year. As might be expected, second home use was most extensive during the summer months (June, July, and August). Summer user days were 48 percent of the total followed by 22 percent during the fall, 16 percent during the spring, and 14 percent during the winter. Assuming the seasonal pattern of spending paralleled that of use, approximately \$1,000,000 of consumption spending by second home owner occurred during the summer months while only a little over \$300,000 occurred during the winter.

Spending Patterns: Second Home Owners vs Permanent Residents

A point of interest in the examination of spending by second home owners is the degree to which their spending for various items corresponds to spending patterns of permanent residents. Direct comparison of the two groups is prohibited by the fact that no survey of spending by permanent residents in the study area is available. However, second home spending may be compared to spending by residents of the western region of the United States during 1972 and 1973 (U.S. Department of Labor [1978]). Table 4.2 presents the results of such a comparison. The spending information in our survey was not as comprehensive as that included in the consumer expenditures survey conducted by the Department of Labor. For example, the second home survey did not ask about expenditures for housing (mortgage payments), taxes, or the purchase of automobiles. In comparing the spending of the two groups only those categories of spending enumerated in the second home survey were included so that the sum of the enumerated items

equals 100 percent for both groups. The results of this comparison are listed in Table 4.2. The relative importance of the various types of spending is approximately equal for all items except clothing and utilities. Clothing is a much less important item in the spending by second home owners than it is in the spending of permanent residents. This is understandable since second home owners probably purchase most of their clothing in the area of their primary residence. Second home owners spending for utilities is much higher than that of permanent residents in relative terms (over 2.5 times greater). A portion of this difference may be explained by substantial increases in energy prices which have occurred since the 1972-73 period for which the permanent resident study was conducted. However, utilities also make up a much larger proportion of the second home budget due to high per unit charges by utility companies. Second home owners typically pay higher unit costs for utilities because of their remote location and sporadic use patterns. One individual in our survey of electric utility records paid over \$180 in electric bills, although this second home owner used no electricity for the entire year.

Total Economic Impact of Second Home Consumption Spending on the Area Economy

Previous sections of this chapter have discussed the direct consumption spending of second home owners. This spending does not represent the total impact of second homes on the area economy, however. When second home owners make purchases in a local grocery store these purchases cause the grocery store owner to

Table 4.2

RELATIVE IMPORTANCE OF DIFFERENT TYPES OF SPENDING:
PERMANENT RESIDENT SPENDING VERSUS SECOND HOME SPENDING

	<u>Permanent Residence*</u>	<u>Second Home**</u>
Food at Home	32.8%	31.6%
Restaurants & Bars	12.6%	13.9%
Gas & Auto Repairs	19.7%	16.1%
Clothing	16.4%	3.9%
Furniture & Appliances	10.0%	11.6%
Utilities	8.5%	23.0%
	<hr/> 100.0%	<hr/> 100.1%

*Taken from average spending patterns of families in the West region United States Consumer Expenditure Survey 1972-3, U.S. Department of Labor.

**Taken from survey data of this study, average for all second home owners in the study area.

increase his purchases from wholesale suppliers. Virtually all purchases have this type of effect on some other sectors of the economy. Increased restaurant sales would cause sales by supermarkets and wholesale restaurant equipment suppliers to increase. The increased supermarket sales would in turn lead to increased sales by wholesalers of groceries, etcetera. The sales of various sectors of the local economy are interrelated and the effects of sales in one sector on sales in related sectors are called indirect effects.

Even these indirect effects do not measure the total impact on the economy. When sales in an industry and other industries related to it are increased through direct and indirect effects, additional employees must soon be hired to service these added sales. These added employees in turn make consumer purchases in various sectors of the local economy. These purchases by the new employees are called short run induced effects.

Over a longer time period even more effects are felt from each initial sales increase. The employees hired to service the increased sales will require houses to live in and businesses experiencing growing sales will expand their buildings. In addition, the presence of the added employees will necessitate increases in local government spending for schools and police and fire protection. These effects are called long run induced effects.

Input-output analysis provides a means of quantifying these indirect and induced effects. The input-output model measures the interrelationships between various industries in a region, state, or nation and provides estimates, through multipliers, of how much indirect and induced spending is caused by each dollar of direct spending.

Three types of multipliers are of interest: the very short run multiplier includes only the direct and indirect effects of a change in sales in some sector of the economy. This measures the impact of changes in sales over a period of time that is too short for businesses to hire new employees, (e.g., a very short run multiplier of 1.5 indicates that for every dollar of direct spending added, \$1.50 in sales will occur in the economy). The short run multiplier includes short run induced effects as well as direct and indirect effects. It measures the impact of a direct change in sales over a period of time long enough for new employees to be hired to service those sales but not long enough for adjustments in the level of investment in new housing and business structure construction or in the level of local government services. The long run multiplier includes direct, indirect, short run induced, and long run induced effects. It measures the eventual impact of a direct change in sales in some sector of the area economy after sufficient time has passed to allow all aspects of the economy to fully adjust to that change.

An input-output model for the study area was developed by Baskett and Ayer [1976]. The input-output model in that study has been used in deriving the multipliers for second home spending listed below. The methodology used in deriving these multiplier results from the input-output model is described in Appendix C.

Table 4.3 lists the estimated total very short run, short run, and long run effects of second home consumption spending on the area economy. The very short run impact is just over 2.4 million dollars while the short run and long run impacts are about 3.8

Table 4.3
TOTAL EFFECTS OF SECOND HOME
CONSUMPTION SPENDING ON THE AREA ECONOMY

Direct Spending	2,074,900
X Very Short Run Multiplier	1.171
= Very Short Run Effect	<u>2,429,000</u>
 Direct Spending	 2,074,900
X Short Run Multiplier	1.849
= Short Run Effect	<u>3,836,000</u>
 Direct Spending	 2,074,900
X Long Run Multiplier	2.093
= Long Run Effect	<u>4,343,000</u>

Source: Study survey data and Economic Impacts of United States Forest Service Policies on Local Communities: An Interindustry Analysis of the Salt-Verde Basin, Arizona, Baskett and Ayer (1976).

and 4.3 million dollars respectively. The estimated long run impact is slightly more than twice the direct spending by second home owners.

Multiplier values for the spending of different groups in an economy vary because the spending of some groups is concentrated in sectors which are highly interrelated with other sectors of the area economy while other groups make purchases from sectors with fewer indirect effects. Our estimates of the multiplier associated with second home consumption spending indicate that it is as large or larger than the multipliers associated with other types of consumption. The very short run second home consumption spending multiplier is significantly larger at 1.17 than the very short run transient recreation (tourist) multiplier of 1.108. Thus each dollar spent by second home owners has a greater impact on the local economy than a dollar spent by the typical tourist.

Economic Impact of Second Home Construction Spending on the Area Economy

The preceding sections have concentrated on consumption spending by second home owners. This has excluded one very important component of second home owner spending, the purchase of the second home itself. Two factors make the measurement of this component of second home owner spending difficult. First, individuals who built or bought second homes several years ago are unlikely to be able to accurately estimate the current value or replacement cost of their property. For this reason direct survey information is not used to estimate the value of second

homes. The second problem stems from the fact that homes last much longer than one year. The amount of spending for home construction and maintenance per year will be much less than the total value of all second homes. Housing related spending by second home owners consists of the costs of replacement and repair of existing second homes and the value of newly constructed second homes which are added to the stock of second homes in the area. Thus, the annual level of housing related spending by second home owners will be much higher in an area where the number of second homes is increasing rapidly than in an area with a similar stock of second homes which is not experiencing growth in that stock.

Estimation of the annual level of construction related second home spending was a two step process requiring the estimation of both the average cost of constructing a second home and the number of second homes constructed per year. Since neither of these estimates could be obtained from a direct survey, estimates of construction related spending are likely to be less accurate than the estimates of other components of second home related spending.

Two sources for estimating the average value of second homes in the study area are available. People owning second homes in Northern Arizona were asked to report the total value of their second home property in Hogan's [1977] study. The value of an average second home property (house and land) in Northern Arizona in 1974 was in the range of \$20,000 to \$25,000 according to that study. A second estimate of the average value of second homes may be obtained from the assessed value of the second home properties

identified in this study. The average assessed value of the second homes in our survey was \$3,094. Since residential property is assessed at 15 percent of market value, the implied average market value of a second home in the study area is \$20,625.

Weaknesses of the former estimate include the facts that it refers to 1974 values and it relates to an area larger than the area of the present study. A weakness of the latter estimate is the fact that property values used for assessment purposes typically lag behind true market value particularly during times of rapidly increasing property values. Both estimates include the value of the property as well as the value of the home itself. Only the latter is appropriate in estimating the contribution of second homes to construction activity in the study area. Considering all of the factors cited above, the average current construction cost of a second home in the study area is estimated to be \$17,500.

Bond and Dunikoski [1976] have estimated that the number of second homes in Northern Arizona has been increasing at a rate of about ten percent per year. If this growth rate is appropriate, the amount of construction required for the replacement of the existing stock of second homes should be negligible because of the extremely small stock of second homes of sufficient age to require replacement. Thus, the annual level of second home construction is assumed to equal one-tenth of the current stock of second homes or 135 homes.

The level of direct spending for construction of second homes calculated from the above estimates is \$2,362,500 (\$17,500 per

house times 135 houses). This level of direct spending was applied to the construction industry multipliers of the Ekholm study, as described in Appendix C, to compute the very short run, short run, and long run effects of this spending on the area economy. The effects were: very short run impact - \$3,331,000; short run impact - \$5,261,000; and long run impact - \$6,166,125.

These results indicate that construction is a very important element of the impact of second home development on the area economy. In fact the construction impact appears to outweigh the effects of all other second home owner spending combined. This would be true only during a period of expansion in the number of second homes, however. In a mature area where the stock of second homes is not increasing, the level of construction would be determined solely by the amount of replacement, repair, and expansion of existing second homes. This level might reasonably be hypothesized to be no more than four percent of the value of the stock of second homes. (This implies that the average life of a second home is at least 25 years.) If that four percent rate of replacement is applied to the present stock of second homes, the implied level of direct construction spending would be \$945,000 which is less than half of the level of second homeowner spending for other items.

The estimates developed above indicate that construction related activity is a very major part (perhaps half or more) of the total impact of second home ownership on the area economy at the current state of development. However, the relative importance of construction must be expected to decline as second home developments in the area mature.

CHAPTER V

WASTE DISPOSAL FACILITIES

This chapter summarizes survey responses relating to the waste water and solid waste disposal facilities in second home areas. As was suggested in Chapter II, quantitative measurement of the waste matter produced by second homes is perhaps not as significant as analysis of the type and quality of waste facilities at second home sites. Therefore, the information presented here concentrates on qualitative factors. Second home owners were asked about the type of waste water and solid waste facilities present at their second home site. In addition, they were asked if they felt that the solid waste facilities available at their second home sites were adequate. The responses to these questions are presented in Table 5.1 and are discussed below.

Table 5.1 indicates that just over 36 percent of those responding to the questionnaire had sewer facilities at their second home sites while 57 percent utilized septic tanks and 6.7 percent had no waste disposal facilities other than privies. As noted in Chapter II, Segall's [1971, 1973] investigation of second home waste water disposal facilities indicated the sewers using secondary treatment techniques presented a more widespread danger to groundwater quality than did septic tanks and privies. However, analysis of the responses obtained here indicates that many of the second homes with sewer systems were

TABLE 5.1

SECOND HOME WASTE DISPOSAL FACILITIES1. Waste Water Disposal Facilities;

<u>Type</u>	<u>Number</u>	<u>Percentage</u>
a. Sewer	65	36.3%
b. Septic Tank	102	57.0%
c. None	12	6.7%
Total	179	100.0%

2. Solid Waste Disposal Facilities;

<u>Type</u>	<u>Number</u>	<u>Percentage</u>
a. Common (i.e. Dumpster)	32	18.0%
b. Home Pick Up	51	28.6%
c. Owner Carry-Out from area	95	53.4%
Total	178	100.0%

3. Solid Waste Disposal Facilities Are Adequate?

<u>Response</u>	<u>Number</u>	<u>Percentage</u>
a. Yes	156	90.2%
b. No	17	9.8%
Total	173	100.0%

attached to the tertiary sewer systems of the Flagstaff urban area. Presumably the sewer systems of these cities provide a greater margin of safety than would be feasible for an isolated second home development.

Eighteen percent of the survey respondents reported that solid waste in their second home area was deposited into a common container, such as a dumpster, for eventual removal from the area. Approximately 28.5 percent reported that they had regular house-to house garbage pick-up service. Over 50 percent of the respondents indicated that they personally collected and removed their solid waste from the second home site. These figures indicate quite clearly that most of the responsibility for prevention of pollution of the forest environment through solid waste falls directly on the individual second home owner. Solid waste pollution of the forest environment by second home owners can be avoided only if each second home owner is responsible in that respect. Slightly less than ten percent of those responding felt that the solid waste disposal facilities at their home site were inadequate to protect the environment.

The survey responses do not indicate waste disposal problems associated with second homes which are disproportionate to their numbers. The responses do, however, indicate that individual second home owners in most cases must personally remove solid waste from their second homes. Although the vast majority of second home owners felt this system to be adequate, two respondents specifically mentioned that other second home owners in their area were not adequately taking care of their solid waste.

CHAPTER VI

SECOND HOME ENERGY RESOURCE USE

Use of scarce energy resources by second home owners is an important element of their ecological impact. To measure this use second home owners were surveyed as to their use of electricity, natural gas, fuel oil, and propane.

A wide variety of energy sources are used in Flagstaff area second homes. Among our survey respondents (see Table 6.1) over 90 percent use electricity in their second homes and nearly 90 percent have fireplaces indicating the capability of using wood as a fuel. Presence of other fuel sources is much less prevalent; about 30 percent of the respondents use propane, 12 percent have natural gas, and less than 5 percent use fuel oil. It is evident that second home owners using the latter fuel sources use them primarily for heating and in some cases cooking while most of them also have electricity present in their second homes for lighting and other purposes.

Because many second home owners use more than one energy source at their second homes, one can not determine with certainty which types of fuel were used for which functions. Since home heating is typically the most important item of residential energy use, second home owners were asked to describe the heating system present in their second home. Only one of the 174 respondents had no heat source. Just under 40 percent of the respondents

TABLE 6.1
ENERGY SOURCES AND TYPE OF HEATING SYSTEMS USED IN
FLAGSTAFF AREA SECOND HOMES

Type of Energy Source	Energy Sources	
	Number of Respondents Having This Source	Percent of Respondents Having This Source
Electricity	158	90.8
Propane	57	32.8
Natural Gas	21	12.1
Fuel Oil	8	4.6
Wood*	154	88.5

*As indicated by the presence of a fireplace.

Type of System	Heating Systems	
	Number of Respondents Having This System	Percent of Respondents With This Type of System
Central	65	37.3
Space	77	44.3
Fireplace**	154	88.5
None	1	0.6

**Many respondents had fireplaces in addition to central or space heating systems

Source: Survey Data.

had a central heating system, while almost 45 percent had space heaters. Many second homes with central and space heating also had fireplaces but approximately 18 percent of the respondents depend on fireplaces as their sole heat source.

Given the climate of the area it may be assumed that virtually all homes intended for extensive winter use would be equipped with central heat. Thus, it appears that at least 60 percent of the area's second homes are not designed for heavy winter use.

Table 6.2 presents the distribution of second home spending for each type of energy resource available. The percentages listed in this table are the percentage of those using that energy source whose spending was reported to be in the given range.

The data of Table 6.2 are converted into average annual spending levels across all 174 respondents in Table 6.3. These average expenditure levels are then multiplied by the number of BTUs of energy per dollar spent to obtain estimates of the average level of BTUs supplied per second home from each energy source. The table indicates that three times as much was spent on average for electricity in second homes as for all other energy sources combined. However, in terms of the number of BTUs of energy supplied, propane and natural gas appear to be the most important energy sources. This disparity is due to the much higher cost per BTU of electricity. The higher cost is due in part to the fact that BTUs of electric energy are measured at the residence and thus do not include the substantial energy loss associated with generating electricity. When this energy loss is not included, electric energy is typically much more expensive per

TABLE 6.2

SPENDING BY SECOND HOME OWNERS FOR ENERGY RESOURCES

Electricity		
Annual Expenditures	Users In This Spending Range	Percent of Users In This Spending Range
\$ 0 to \$ 60	14	8.9
\$ 60 to \$120	47	29.9
\$120 to \$240	54	34.4
\$240 to \$360	20	12.7
\$360 to \$480	15	9.6
\$480 or over	7	4.4
	<hr/> 157	<hr/> 99.9

Propane		
Annual Expenditures	Users In This Spending Range	Percent of Users In This Spending Range
\$ 0 to \$ 50	19	35.2
\$ 50 to \$100	13	24.1
\$100 to \$150	11	20.4
\$150 to \$250	8	14.8
\$250 to \$350	3	5.6
\$350 or over	0	0.0
	<hr/> 54	<hr/> 100.1

Natural Gas		
Annual Expenditures	Users in This Spending Range	Percent of Users In This Spending Range
\$ 0 to \$ 50	1	5.6
\$ 50 to \$100	5	27.8
\$100 to \$150	1	5.6
\$150 to \$250	4	22.2
\$250 to \$350	6	33.3
\$350 or over	1	5.6
	<hr/> 18	<hr/> 100.1

TABLE 6.2 (con't)

Fuel Oil

Annual Expenditures	Users In This Spending Range	Percent of Users In This Spending Range
\$ 0 to \$ 50	1	12.5
\$ 50 to \$100	0	0.0
\$100 to \$150	1	12.5
\$150 to \$250	4	50.0
\$250 to \$350	2	25.0
\$350 or over	0	0.0
	<hr/> 8	<hr/> 100.0

Source: Survey Data.

TABLE 6.3

AVERAGE SECOND HOME ENERGY USE

Type of Source	Average Annual ¹ Spending Per Home	(1000's) of BTU's of Energy Per \$ Spent ²	BTU's of Energy Used (millions)
Electricity	\$175.0	31.6	5.58
Propane	\$ 30.6	382.0	11.69
Natural Gas	\$ 20.3	448.0	9.11
Fuel Oil	\$ 8.9	309.6	2.76

Annual Residential Energy Use Per Second Home = 29.14 million BTU's

Average Annual Residential Energy Use Per
Household in the Mountain States³ = 186.6 million BTU's

Second Home Energy Use as a Percentage of
Average Mountain States Household Use = 15.6 percent

¹Computed from Table 6.1 assuming all observations in each spending range to be at the center of that range.

²Price information for all fuel sources except electricity was obtained from: Monthly Energy Review [1978]. The average price per kilowatt hour paid by area second home owners was estimated by analysis of actual utility records of a sample of fifty of our respondents.

³This figure is the 1974 estimated annual use per household and was obtained from: End Use Energy Consumption Data Base: Series I Tables [1978].

unit than other energy forms. In addition, the price per kilowatt hour of electricity paid by area second home owners appears to be much higher than that which would typically be paid by a full time resident. The average cost to second home owners per kilowatt, based on our survey of electric company records, was 10.8 cents. This very high average cost is due to substantial service fees for some second homes in remote areas. In one extreme case, a second home owner paid one hundred eighty dollars in electric bills while not using the second home at all.

Summing across all energy sources, average annual energy use per second home in the study area is 29.14 million BTUs. This total is a little under one-sixth of the average residential energy use per household in the Mountain States. Applying this usage rate to the Flagstaff area and assuming the number of second homes in the area to equal 10 percent of the number of permanent resident households (as derived in Chapter III), second home energy use should equal approximately 1.6 percent of total residential energy use in the study area.

The seasonal pattern of energy resource use is also of importance. This is particularly true of electricity use since generating plants are subject to capacity limitations. In the study area, second home energy use should not contribute heavily to peak period use since the heaviest period of second home use occurs in the summer months while the seasonal peak of area electricity use occurs in the winter.

Overall, one can conclude that second home owners do not contribute heavily to energy problems in the trade area. While

second homes make up about 10 percent of the total number of residences in the area, they contribute only 1.6 percent to residential energy use, and most of that use occurs in off-peak seasons.

CHAPTER VII

SUMMARY AND CONCLUSIONS

This report has investigated several aspects of the economic and ecological impact of second homes on the Flagstaff area economy. The information presented has been developed from: a direct survey of second home owners, various secondary sources, and application of survey data to an input-output model of the Flagstaff trade area. Important results of the study are summarized below.

Chapter III presented a census of second homes in the study area. This census indicated that there are 1352 second homes in the study area. This represents a second home inventory equal to approximately 10 percent of the number of primary residences. However, second homes contribute much less than 10 percent to the average population of the area since second homes are only sporadically occupied. Second homes are estimated to contribute only 2 to 2.5 percent to the area's average population year round while they may contribute as much as 8 to 10 percent to the area's population and forest use during peak summer use periods.

Chapter IV analyzed the economic impact of second homes on the area economy. Average total spending in the area per second home was \$1535 which represented a spending level of \$5.37 per person day of second home use. The survey also indicated that utilities account for an unusually large proportion of spending by second home owners, while second home owners are particularly unlikely to purchase clothing and related items in their second home areas. Total direct

consumption spending by all area second home owners was estimated to be \$2,074,000 which corresponds to a long run impact, including indirect and induced effects, of \$4,343,000 per year. The impact of second home construction on the area was more difficult to measure. It was estimated that in recent years with the stock of second homes growing by 10 percent per year the impact of second home construction activity on the area economy has actually been somewhat larger than the total effect of consumption spending. This would not be true in the absence of a growing stock of second homes, however. Direct spending for second home construction in a steady state situation was estimated to be \$945,000 per year, just less than half the estimated annual direct consumption spending.

Chapter V presented an analysis of second home waste disposal facilities. Over half of the second home owners responding to the survey had septic tanks for liquid waste disposal and less than 7 percent had no liquid waste disposal system. Over half the survey respondents reported that they had to personally remove solid waste from their second home site, but less than 10 percent of them felt that solid waste facilities were inadequate to protect the environment.

Analysis of second home energy use was presented in Chapter VI. Energy use per second home was found to average only about 16 percent of the household energy use of a full-time residence. Second home energy use in the study area

was estimated to equal less than 2 percent of total residential energy use.

The results of this study indicate that the presence of second homes in the study area does provide a significant positive impetus to the area's economy. The most significant negative factor found is the strong seasonal second home use pattern. Second homes are most heavily used during the summer months when the study area and its forests are already experiencing their heaviest use. No strong evidence of inadequate waste disposal facilities was found although a significant minority of respondents felt that solid waste disposal facilities were inadequate, and the survey data certainly did not support the idea that second homes contribute heavily to residential energy use in the area.

APPENDIX A

COLLEGE OF BUSINESS ADMINISTRATION "SECOND HOMES" IMPACT

Coconino County Records indicate that you own a second home at _____ subdivision,
lot # _____ and parcel # _____.

Do you currently own this property and use it as a second home (vacation or summer residence)? Yes _____ No _____.

(If your answer was No, skip the rest of the questionnaire and return it to us as is.)

SECTION A. GENERAL INFORMATION

How many members of your household make frequent use of your second home? (20 days a year or more) _____

About how many days did you or members of your household use your second home during each season last year?

Winter (Dec. 76, Jan. - Feb. 77)	_____ days
Spring (Mar. - May 77)	_____ days
Summer (June - Aug. 77)	_____ days
Fall (Sept. - Nov. 77)	_____ days

SECTION B. WASTE DISPOSAL

What type of water waste disposal system is used for your second home?

_____ Sewer system, _____ Septic tank, _____ No plumbing facilities present

Describe the solid waste disposal facilities at your second home site.

_____ Common dumping facility, i.e. dumpster _____ Other (specify) _____
_____ Home pickup trash disposal service

In your opinion, is the solid waste disposal system at your second home site adequate for sanitation and protection of the surrounding environment? Yes _____ No _____

SECTION C. UTILITY USE

Does your second home have electricity? Yes _____ No _____

If your answer was Yes, how much do you estimate you spent for electricity for your second home last year?

_____ 0 to \$60 _____ \$60 to \$120 _____ \$120 to \$240 _____ \$240 to \$360 _____ \$360 to \$480 _____ over \$480

Do you use any of the following fuels in your second home? _____ Natural gas, _____ Propane or LP gas, _____ Fuel oil

If you use one of the above fuels how much do you estimate that you spent for that fuel for your second home last year?

_____ 0 to \$50 _____ \$50 to \$100 _____ \$100 to \$150 _____ \$150 to \$250 _____ \$250 to \$350 _____ over \$350

Indicate which of the following types of heating facilities are present in your second home:

_____ central heat, _____ space heating, _____ fireplace, _____ none

SECTION D. SPENDING

How much do you estimate that your family spent in the vicinity of your second home site (Southern Coconino County) for each of the following items (estimate for the past 12 months)?

\$ _____ Food and beverages consumed at the second home (groceries, etc.).
\$ _____ Meals and drink away from home (spending in restaurants & bars).
\$ _____ Recreation and amusements. (includes movie tickets, gold green fees or membership dues, etc., & spending for recreational equipment.)
\$ _____ Gasoline and auto servicing and repair.
\$ _____ Clothing
\$ _____ Furniture and appliances
\$ _____ Utilities
\$ _____ Other items, please specify any major items of spending (over \$250) not listed above.

Please send the next issue of: _____ Arizona Highways _____ Sunset

Name _____ Address _____

APPENDIX B

FIGURE B.1

LOCATION OF SUBDIVISIONS
CONTAINING SECOND HOMES

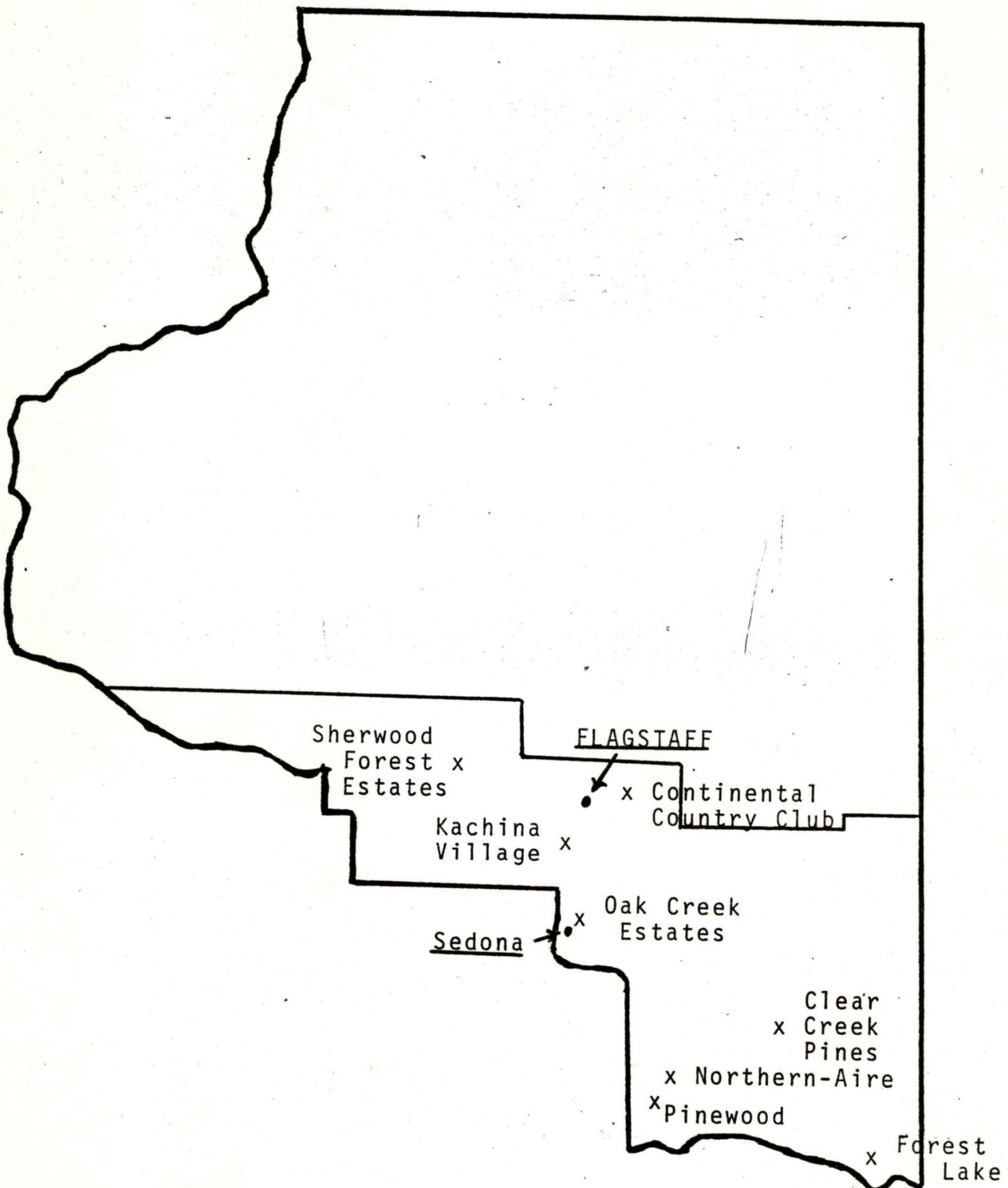


Table B.1
PATTERNS OF AVERAGE SPENDING AND USE BY
SECOND HOME OWNERS IN VARIOUS SUBDIVISIONS

	No. of Responses	Assessed Value of Improvements	User Days	Spending per User Day
Oak Creek Estates	5	\$ 3211	182	\$ 10.25
Sherwood Forest	6	1768	127	10.13
Continental Country Club	21	3425	318	9.79
Norther-Aire	9	5740	357	5.56
Kachina Village	5	3377	245	5.35
Forest Lake Estates	9	1741	201	4.38
Clear Creek Pines	20	1680	260	3.95
Pinewood	19	3409	329	3.77

Source: Study Survey Data.

Table B.2
Spending By Category By Second
Home Owners in Various Subdivisions

SUBDIVISION	FOOD & BEV.	RESTAURANTS & BARS	RECREATION	GAS & AUTO REPAIRS	CLOTHING	FURNITURE & APPLIANCES	UTILITIES	OTHER
Continental Country Club	2.28	1.04	1.57	.77	.23	.97	1.52	1.41
Clear Creek Pines	.63	.21	.16	.61	.10	.16	.61	1.47
Forest Lake Estates	1.77	.45	.13	.65	0	.03	1.24	.11
Kachina Village	2.10	.57	.02	1.06	.11	.29	1.20	0
Norther- Aire	1.17	.80	.92	.59	.40	.50	.96	.22
Oak Creek Estates	2.32	.52	.14	.77	.16	1.43	1.51	3.40
Pinewood	.84	.51	.58	.48	.15	.34	.76	.11
Sherwood Forest	1.59	.58	.18	.94	.07	0	1.12	5.65

APPENDIX C

This appendix describes the methodology used to derive the multipliers for second home spending used in this study. Throughout this appendix The Structure of the Flagstaff Trade Area Economy, Ekholm [1977], is referenced and reference to a copy of that publication is necessary to fully understand the figures derived here.

The input-output model does not provide direct estimates of the very short run multiplier for second home owners as a separate group. The very short run multiplier for this group has been calculated by a weighted average of sectoral multipliers from the input-output study, Ekholm [1977], Table 5, pages 29-31. The weighting of the sectors was set proportional to their contributions to total direct spending by second home owners as indicated by our survey data. The allocation of spending categories to input-output sectors was as follows:¹ the food at home category was allocated to sector 14 (food stores); the restaurants and bars category was allocated to sector 13 (eating and drinking places); the recreation category was allocated to sector 26 (recreation and amusement services); the clothing category was allocated to sector 19 (apparel and accessory stores); the furniture and appliance category was allocated to sector 15 (furniture, home furnishings, and equipment stores); the utilities category was allocated to sector 9 (electric,

¹See Ekholm [1977], pages 67-70.

gas, water and sanitary services); the gas and auto repairs category was allocated to sectors 18 and 27 (gasoline service stations and auto repair services and garages) in proportion to these sectors relative 1973 employment levels; and finally, the other category was allocated to all appropriate sectors of the input-output model in proportion to their relative 1973 employment levels. The results of these allocations are presented in Table C.1.

Once these allocations have been made the very short run multiplier for second home spending is calculated as a weighted average of the various sectoral multipliers (see Table C.2). The estimated spending in each sector is multiplied by the sectoral very short run multiplier, the total for all sectors is summed, and this figure is divided by the total direct spending figure of \$2,074,900 to derive the implied very short run multiplier for second home consumption spending (1.171).

The very short run multiplier is then simply multiplied by the short run and long run induced ratios respectively to obtain the short run and long run multipliers. These implied induced ratios (obtained by dividing short run multipliers by very short run multipliers and long run multipliers by very short run multipliers) are 1.560 and 1.787 respectively.

The multipliers for second home construction activity (investment) have been assumed to be the same as the multipliers for other types of construction activity. These multiplier values have been taken directly from pages 46, 48, and 50 of Ekholm [1977]. The multipliers are: very short run 1.410, short run 2.227, and long run 2.610.

Table C.1

ALLOCATION OF SECOND HOME SPENDING TO INPUT-OUTPUT SECTORS

Sector	Direct Allocation	Allocation of the "Other" Category		Total Spending
		Sector Employment	Contribution** to Other Spending	
9	\$340,200			\$340,200
10		289	\$36,400	36,400
12		487	\$61,400	61,400
13	\$205,900			205,900
14	\$467,800			467,800
15	\$171,200			171,200
16		460	\$58,000	58,000
17		143	\$18,000	18,000
18	\$191,800*			191,800
19	\$ 58,000			58,000
20		491	\$61,900	61,900
21		209	\$26,300	26,300
22		123	\$15,500	15,500
23		197	\$24,800	24,800
25		358	\$45,100	45,100
26	\$197,700			197,700
27	\$ 46,300*			46,300
28		241	\$30,400	30,400
29		144	\$18,200	18,200
Total		3142	\$296,000	\$2,074,900

* Gas and automobile repair spending was ratioed to the Gasoline Service Station sector (sector 18) and the Automobile repair services sector (sector 27) proportionally to employment in the two sectors.

** This column was obtained by multiplying the employment in each sector by $396000 \div 3142$ or by 126.

Sources: Study survey data and the structure of the Flagstaff Trade Area Economy, Ekholm (1977).

Table C.2
DERIVATION OF THE SECOND HOME
CONSUMPTION MULTIPLIERS

Very Short Run Multiplier =

The sum for all sectors of

sectoral spending X sectoral very short run multiplier
 (Table C.1) (Ekholm[1977], Table 5, pp. 29-31)

divided by \$2,074,900 = 1.171
 (direct spending)

Short Run Multiplier =

Very short run multiplier X Short run induced ratio
 (above) (derived from Ekholm[1977],
 pages 46 and 48)

= 1.171 X 1.580 = 1.849

Long Run Multiplier =

Very short run multiplier X Long run induced ratio
 (above) (Ekholm[1977], pp. 46 and 50)

= 1.171 X 1.787 = 2.093

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